



Montana Fish, Wildlife & Parks

Targeted Elk Brucellosis Surveillance Project March 2017 Post-Capture Update

Elk capture and sampling efforts for the Targeted Elk Brucellosis Surveillance project occurred February 24th through March 4th, 2017. Twenty elk in the Silver Run area east of Red Lodge were captured and screened for exposure to brucellosis (Figure 1), and 10 of these elk were outfitted with GPS radiocollars programmed to record locations every 2-hours for 1-year. The purpose of this capture effort was to improve the sample size for elk in this area and gain additional movement data from elk ranging farther northeast than previously sampled last winter. Blood was collected in the field and later screened for exposure to brucellosis at the Department of Livestock (DOL) Diagnostic Laboratory. All elk tested seronegative for brucellosis (Table 1).

Table 1. The total number of elk sampled, the number of seropositive elk, estimated seroprevalence, and the number of GPS collars deployed in the Silver Run area in 2017. The numbers in parentheses represent the lower and upper bounds of the 95% confidence interval on the seroprevalence estimate.

Population	Total Elk	Seropositive	Seroprevalence	GPS Collars
Silver Run 2017	20	0	0 (0, 0.16)	10

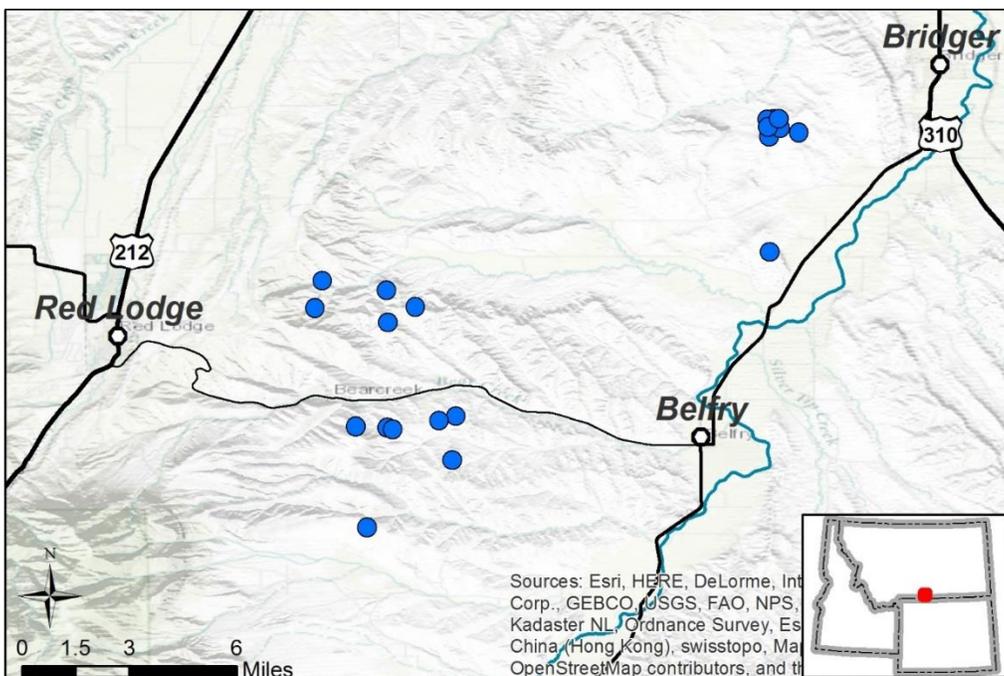


Figure 1. Capture locations of 20 seronegative elk in the Silver Run area east of Red Lodge, MT.

Forty-three elk in the Sixmile Creek area of the Paradise Valley were captured (Figure 2) and 42 were screened for exposure to brucellosis. Twelve out of 42 elk tested seropositive giving the population a seroprevalence of 0.29 (95% confidence intervals: 0.16 – 0.45; Table 2). Three elk died during capture, and the remaining 40 elk were outfitted with radiocollars. The purpose of this capture, sampling, and collaring project is to evaluate the effects of brucellosis management hazing and lethal removal on elk distributions and spatial overlap with livestock. These satellite collars enable real-time data viewing and will document fine-scale elk movement patterns during the risk period and times of management actions. Hazers on the ground are concurrently keeping logs of all management actions for comparison to elk distribution. Collars will record the elk’s location every hour from December through April (i.e., likely management action season) and every 11 hours from May through November. These collars should function for three years and will remain on the elk.

Table 2. The total number of elk sampled, the number of seropositive elk, estimated seroprevalence, and the number of GPS collars deployed in the Sixmile Creek area in 2017. The numbers in parentheses represent the lower and upper bounds of the 95% confidence interval on the seroprevalence estimate.

Population	Total Elk	Seropositive	Seroprevalence	GPS Collars
Sixmile Creek	42	12	0.29 (0.16, 0.45)	40

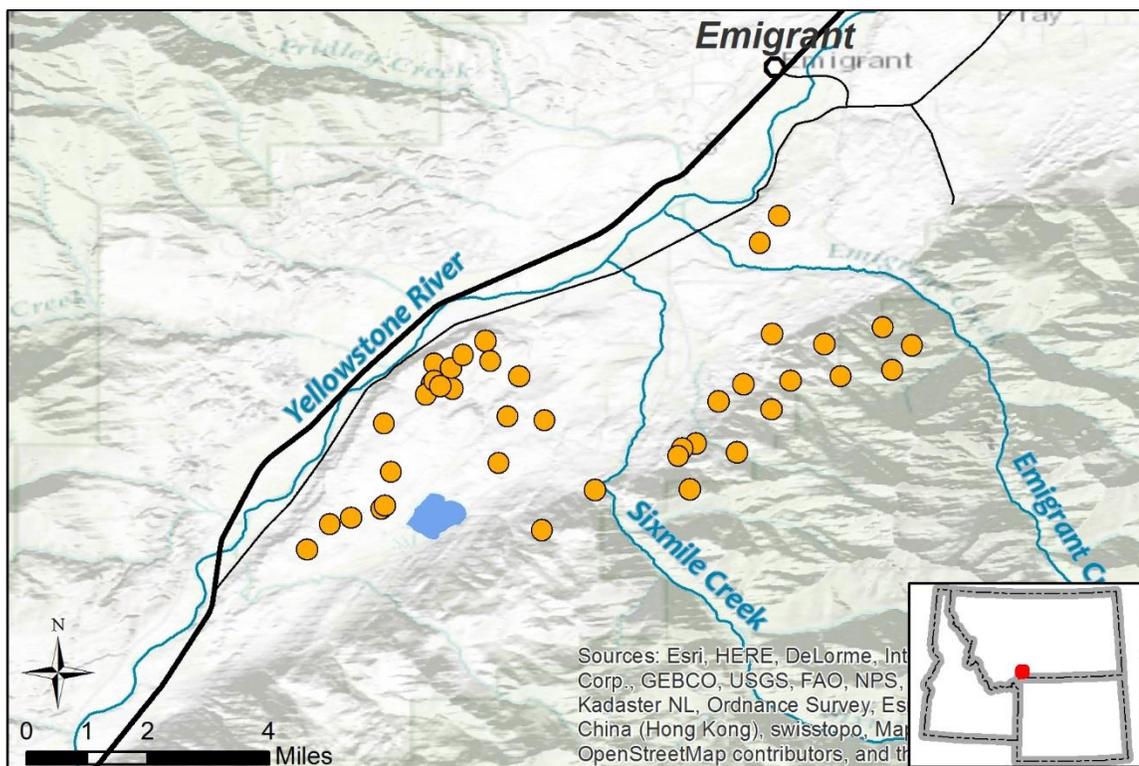
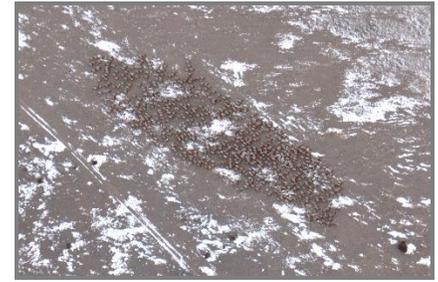


Figure 2. Capture locations of 43 elk in the Sixmile Creek area south of Emigrant, MT.

Additionally, elk captured in previous years of this project were recaptured for continued monitoring (seropositives) and/or collar removal (seronegatives; Figure 3). Seropositive elk captured and collared during the first 5-years of the Targeted Elk Brucellosis Surveillance Project are recaptured and sampled annually for

five years to monitor their brucellosis serology (i.e., seropositive, seronegative), reproductive status (e.g., pregnancy, abortion, live birth), and evaluate their ability to shed *Brucella* on the landscape. During each capture, a blood sample is collected and screened for exposure to brucellosis.



Pregnancy status is determined via rectal palpation and all pregnant elk receive a Vaginal Implant Transmitter (VIT) that is used to monitor the fate of the pregnancy. VITs are expelled during the birthing process. Elk with VITs are tracked at least twice per week until the VIT is expelled. Monitoring VITs will allow biologists to determine the timing and location of birthing events, and determine the potential for seropositive elk to shed *Brucella abortus* on the landscape. Following 5 years of monitoring, elk are removed from the population, necropsied, and tissues are sampled to determine if they are actively infected with brucellosis. Active infection is determined by culturing (i.e., growing) *Brucella abortus* bacteria from tissue samples, as opposed to serology which only detects antibodies to the bacteria in the blood.

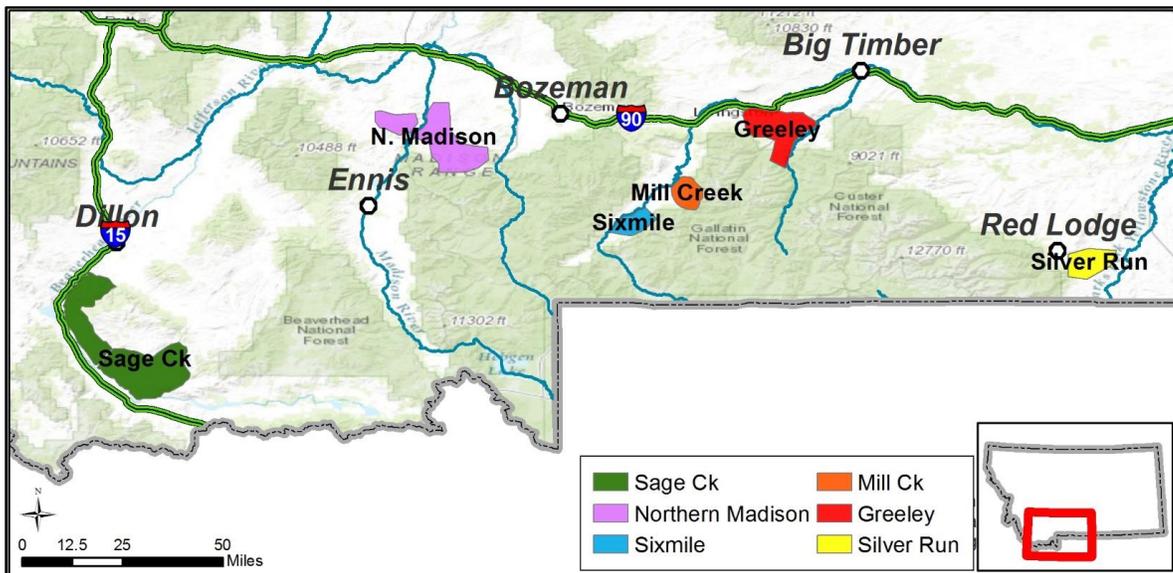


Figure 3. Elk populations involved in capture operations in 2017.

In the Northern Madison area, we recaptured all 5 seropositive elk (Figure 4). One of those elk suffered a broken leg during the recapture event and was euthanized. Two out of the remaining 4 elk were pregnant and received VITs. One of the pregnant seropositive elk expelled her VIT 7 days after capture. No fetus was observed at the site and *Brucella abortus* bacteria was not detected on either the VIT or uterine fluid found at the site. It is possible that the VIT was not inserted securely and fell out or an abortion is possible. In the Greeley area, we recaptured 2 seropositive elk (Figure 5). Both elk were pregnant and received VITs. In the Mill Creek area, we recaptured 8 out of 9 seropositive elk (Figure 5). Six out of the 8 elk were pregnant and received VITs. One of these elk expelled her VIT on March 19th, but investigation of the scene indicates this VIT fell out due to a broken wing and inability to stay in place. We are currently monitoring the pregnancy status of 5 seropositive elk in Mill Creek, 2 elk in Greeley, and 1 elk in N. Madison (Table 3).

Table 3. Seropositive elk with VITs being tracked for the 2017 parturition season.

Population	Seropositive Elk	Elk with VITs
N. Madison	4	1
Mill Creek	9*	5
Greeley	2	2

*We were unable to recapture 1 seropositive elk

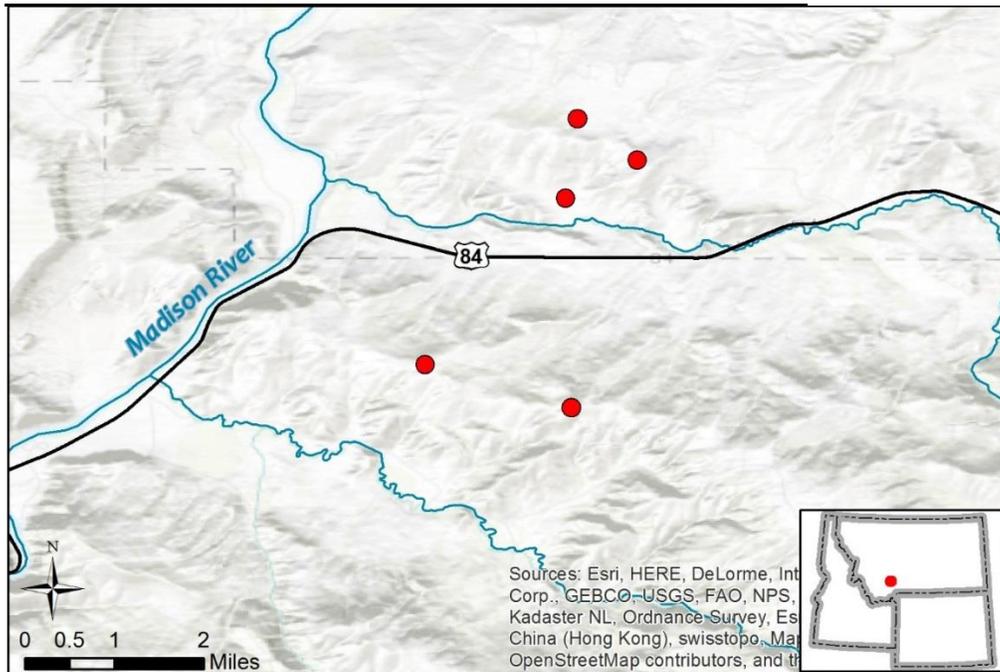


Figure 4. Capture locations of 5 seropositive elk in the Northern Madison population west of Bozeman, MT.

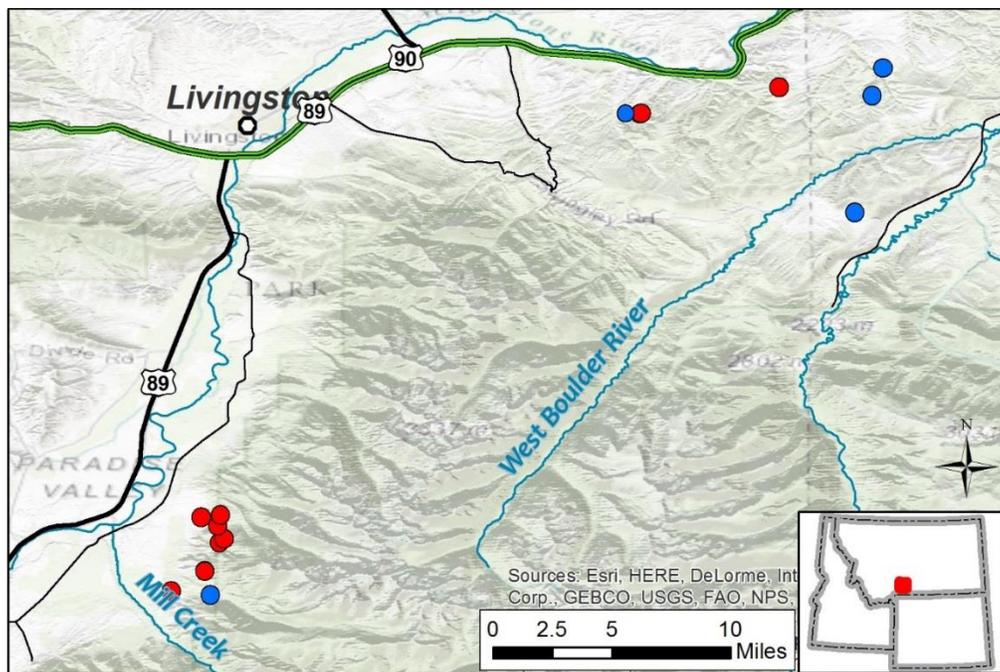


Figure 5. Capture locations of 10 seropositive (red) and 5 seronegative (blue) elk in the Mill Creek and Greeley populations near Livingston, MT.

In addition to the seropositive recaptures, 5 seronegative collared elk from the Greeley and Mill Creek populations were recaptured (Figure 5). The automatic release mechanisms on these collars failed, and the collars were removed to retrieve the GPS data. We were unable to recapture two seronegative collared elk in the Mill Creek population with failed automatic release mechanisms.

One seropositive elk from the Sage Creek population that had been monitored for 5-years was euthanized and transported to the DOL Diagnostic Laboratory for necropsy (Figure 6). This concludes the field portion of the study for the Sage Creek population. In addition, the seropositive elk from the Black's Ford population that was euthanized after suffering a broken leg was also necropsied. Numerous tissues are being culture tested for *Brucella abortus*.

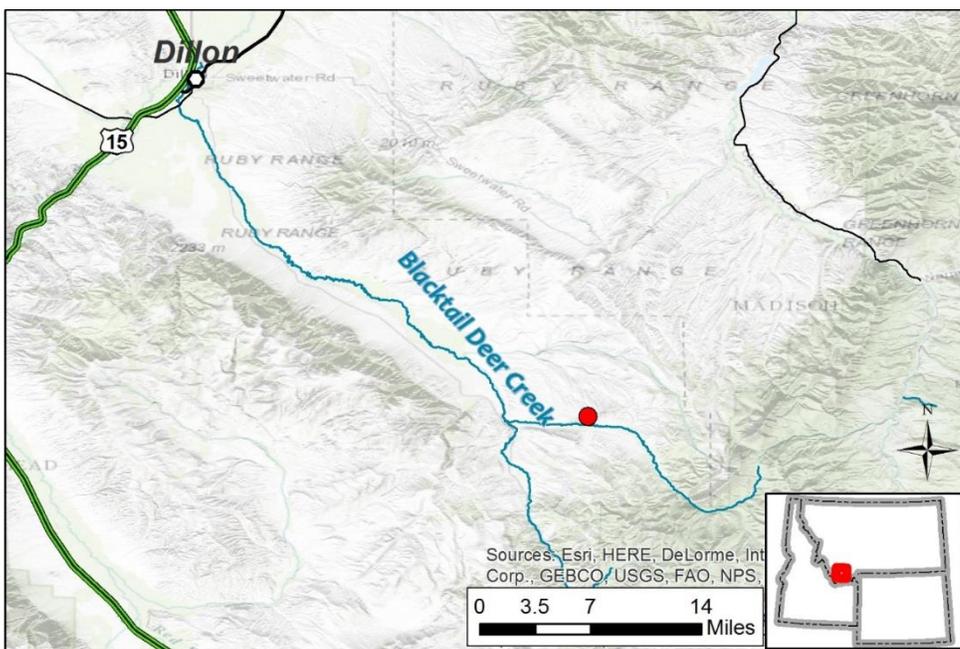


Figure 6. Capture location of 1 seropositive elk in the Sage Creek population euthanized for culture sampling.

A sincere thank you to all FWP personnel, the Quicksilver helicopter capture crew, and landowners within the study areas. This project would not be possible without your efforts and support. For additional information, please contact Jenny Jones 406-868-2637, jennyjones@mt.gov.